Mason E. Sweat, Ph.D.
Mason.sweat@utsouthwestern.edu
masonsweat@gmail.com

3429 Rankin St. Apt. 2
Dallas, TX
75205

Education

Postdoc **Molecular Cardiology** 2020-2025
Mentor: Dr. William Pu, M.D.

Ph.D. **Cell and Developmental Biology**, University of Iowa 2015 –2020
Mentor: Dr. Brad A. Amendt, Ph.D.

B.S. **Biology (Neurobiology), with honors** University of Iowa 2013
Minor: Chemistry

Professional Experience

Assistant Professor 2025 – Pres.
UT Southwestern Medical Center
Department of Internal Medicine
Division of Cardiology/ Harry Moss Heart Center

Postdoctoral Research Fellow 2020 – 2025
Boston Children's Hospital, Department of Cardiology, Laboratory of William T. Pu MD.
Harvard Medical School
K99/R00 fellowship

Graduate Research Assistant 2015 – 2020
Carver College of Medicine, Laboratory of Brad A. Amendt Ph.D.
Ruth L. Kirschstein trainee (T90)

- Investigating the role of microRNA in developmental processes of the tooth, heart and lung by inhibiting miR activity *in vivo* through use of mouse models
- Adapted the deep sequencing SMARTSEQ II single cell RNA sequencing technique for analyzing the expression profiles and heterogeneity of dental epithelial stem cells
- Collaborated with other lab members to investigate *miR-200* in bone formation
- Trained new graduate students, rotation students and undergraduates in a wide range of experimental techniques

Research Intern 2014 – 2015
Carver College of Medicine, Laboratory of Brad A. Amendt Ph.D.
University of Iowa Carver College of Medicine, Iowa City, IA.

- Examined the protein-protein interactions of key transcription factors required for tooth development in order to understand how they regulate each other's ability to promote the expression of target genes

Undergraduate Student Researcher
Department of Biology, University of Iowa, Laboratory of Jan Fassler, Ph.D. 2011-2013

Publications

Journal Articles:

Sweat ME, Shi W, Sweat YY, Li J, Li J, Keating EM, Ponek A, Ma Q, Park C, Trembley MA, Wang Y, Hou C, Bezzerides VJ, Conlon FL, Pu WT. TBX5 and CHD4 Coordinately Activate Atrial Cardiomyocyte Genes to Maintain Cardiac Rhythm Homeostasis. Circulation. 2025 Aug 13. doi: 10.1161/CIRCULATIONAHA.125.073833. Epub ahead of print. PMID: 40799140.

Leonard R, Zhao Y, Eliason S, Zimmerman K, Batz A, Hatcher CJ, Weiss RM, **Sweat M**, Li X, Amendt BA. Single-nuclei multiomics analysis identifies abnormal cardiomyocytes in a murine model of cardiac development. Nat Commun. 2025 Jul 29;16(1):6947. doi: 10.1038/s41467-025-62208-9. PMID: 40721580; PMCID: PMC12304165.

Yazawa E, Keating EM, Wang S, **Sweat ME**, Ma Q, Xu Y, Schlame M, Pu WT. A murine model of Barth syndrome recapitulates human cardiac and skeletal muscle phenotypes. Dis Model Mech. 2025 May 1;18(5):dmm052077. doi: 10.1242/dmm.052077. Epub 2025 May 19. PMID: 40326536; PMCID: PMC12128220.

Bortolin RH, Nawar F, Park C, Trembley MA, Prondzynski M, **Sweat ME**, Wang P, Chen J, Lu F, Liou C, Berkson P, Keating EM, Yoshinaga D, Pavlaki N, Samenuk T, Cavazzoni CB, Sage PT, Ma Q, Whitehill RD, Abrams DJ, Carreon CK, Putra J, Alexandrescu S, Guo S, Tsai WC, Rubart M, Kubli D, Mullick AE, Bezzerides VJ, Pu WT. Antisense Oligonucleotide Therapy for Calmodulinopathy. Circulation. 2024 Aug 19. doi:10.1161/CIRCULATIONAHA.123.068111. Epub ahead of print. PMID: 39155863.

Prondzynski M, Berkson P, Trembley MA, Tharani Y, Shani K, Bortolin RH, **Sweat ME**, Mayourian J, Yucel D, Cordoves AM, Gabbin B, Hou C, Anyanwu NJ, Nawar F, Cotton J, Milosh J, Walker D, Zhang Y, Lu F, Liu X, Parker KK, Bezzerides VJ, Pu WT. Efficient and reproducible generation of human iPSC-derived cardiomyocytes and cardiac organoids in stirred suspension systems. Nat Commun. 2024 Jul 15;15(1):5929. doi: 10.1038/s41467-024-50224-0. PMID: 39009604; PMCID: PMC11251028.

Sweat ME, Cao Y, Zhang X, Burnicka-Turek O, Perez-Cervantes C, Arulsamy K, Lu F, Keating EM, Akerberg BN, Ma Q, Wakimoto H, Gorham JM, Hill LD, Kyoung Song M, Trembley MA, Wang P, Gianeselli M, Prondzynski M, Bortolin RH, Bezzerides VJ, Chen K, Seidman JG, Seidman CE, Moskowitz IP, Pu WT. Tbx5 maintains atrial identity in post-natal cardiomyocytes by regulating an atrial-specific enhancer network. Nat Cardiovasc Res. 2023 Oct;2(10):881-898. doi: 10.1038/s44161-023-00334-7. Epub 2023 Oct 12. PMID: 38344303; PMCID: PMC10854392. *An image from this work was featured as the website hero image

Cao Y, Zhang X, Akerberg BN, Yuan H, Sakamoto T, Xiao F, VanDusen NJ, Zhou P, **Sweat ME**, Wang Y, Prondzynski M, Chen J, Zhang Y, Wang P, Kelly DP, Pu WT. In Vivo Dissection of Chamber-Selective Enhancers Reveals Estrogen-Related Receptor as a Regulator of Ventricular Cardiomyocyte Identity. Circulation. 2023 Jan 27. doi: 10.1161/CIRCULATIONAHA.122.061955. Epub ahead of print. PMID: 36705030.

Eliason S, Su D, Pinho F, Sun Z, Zhang Z, Li X, **Sweat M**, Venugopalan SR, He B, Bustin M, Amendt BA. HMGN2 represses gene transcription via interaction with transcription factors Lef-1 and Pitx2 during amelogenesis. J Biol Chem. 2022 Sep;298(9):102295. doi: 10.1016/j.jbc.2022.102295. Epub 2022 Jul 21. PMID: 35872015; PMCID: PMC9418915.

Lu F, Ma Q, Xie W, Liou CL, Zhang D, **Sweat ME**, Jardin BD, Naya FJ, Guo Y, Cheng H, Pu WT. CMYA5 establishes cardiac dyad architecture and positioning. Nat Commun. 2022 Apr 21;13(1):2185. doi: 10.1038/s41467-022-29902-4. PubMed PMID: 35449169; PubMed Central PMCID: PMC9023524.

Sweat Y, Ries RJ, **Sweat M**, Su D, Shao F, Eliason S, Amendt BA, miR-17 acts as a tumor suppressor by negatively regulating the miR-17-92 cluster, Molecular Therapy: Nucleic Acid (2021), doi: https://doi.org/10.1016/j.omtn.2021.10.021.

Remy MT, Akkouch A, He L, Eliason S, **Sweat ME**, Krongbaramee T, Fei F, Qian F, Amendt BA, Song X, Hong L. Rat Calvarial Bone Regeneration by 3D-Printed β-Tricalcium Phosphate Incorporating MicroRNA-200c. ACS Biomater Sci Eng. 2021 Sep 13;7(9):4521-4534. doi: 10.1021/acsbiomaterials.0c01756. Epub 2021 Aug 26. PMID: 34437807; PMCID: PMC8441974.

Sweat M, Sweat Y, Yu W, Su D, Leonard RJ, Eliason SL, Amendt BA. The miR-200 family is required for ectodermal organ development through the regulation of the epithelial stem cell niche. Stem Cells. 2021 Jun;39(6):761-775. doi: 10.1002/stem.3342. Epub 2021 Feb 13. PMID: 33529466; PMCID: PMC8247948.

Eliason S, Sharp T, **Sweat M**, Sweat YY, Amendt BA. Ectodermal Organ Development Is Regulated by a microRNA-26b-Lef-1-Wnt Signaling Axis. Front Physiol. 2020 Jul 14;11:780. doi: 10.3389/fphys.2020.00780. PMID: 32760291; PMCID: PMC7372039.

Sweat YY, **Sweat M**, Yu W, Sanz-Navarro M, Zhang L, Sun Z, Eliason S, Klein OD, Michon F, Chen Z, Amendt BA. Sox2 Controls Periderm and Rugae Development to Inhibit Oral Adhesions. J Dent Res. 2020 Nov;99(12):1397-1405. doi: 10.1177/0022034520939013. Epub 2020 Jul 17. PMID: 32674684; PMCID: PMC7580171.

Yu W, Sun Z, Sweat Y, **Sweat M**, Venugopalan SR, Eliason S, Cao H, Paine ML, Amendt BA. Pitx2-Sox2-Lef1 interactions specify progenitor oral/dental epithelial cell signaling centers. Development. 2020 Jun 4;147(11):dev186023. doi: 10.1242/dev.186023. PMID: 32439755; PMCID: PMC7286298.

Sweat YY, **Sweat M**, Mansaray M, Cao H, Eliason S, Adeyemo WL, Gowans LJJ, Eshete MA, Anand D, Chalkley C, Saadi I, Lachke SA, Butali A, Amendt BA. Six2 regulates Pax9 expression, palatogenesis and craniofacial bone formation. Dev Biol. 2020 Feb 15;458(2):246-256. doi: 10.1016/j.ydbio.2019.11.010. Epub 2019 Nov 23. PMID: 31765609; PMCID: PMC7568837.

Gowans, L.J.J., Cameron-Christie, S., Slayton, R.L., Busch, T., Romero-Bustillos, M., Eliason, S., **Sweat, M.E.**, Sobreira, N., Yu, W., Kantaputra, P.N., Wohler, E., Adeyemo, W.L., Lachke, S.A., Anand, D., Campbell, C., Drummond, B.K., Markie, D.M., van Vuuren, W.J., van Vuuren, L.J., Casamassimo, P.S., Ettinger, R., Owais, A., van Staden, I., Amendt, B.A., Adeyemo, A.A., Murray, J.C., Robertson, S.P., Butali, A., "Missense pathogenic variants in *KLF4A* affect dental morphogenesis resulting in X-linked taurodontism, microdontia and dens-invaginatus," *Front. Genet.* (**2019**), doi: 10.3389/fgene.2019.00800

Akkouch, A., Eliason, S., **Sweat, M.E.**, Romero-Bustillos, M., Zhu, M., Qian, F., Amendt, B.A., Hong, L., "Enhancement of MicroRNA-200c on osteogenic differentiation and bone regeneration by targeting SOX2-mediated Wnt signaling and KLF4," *Hum. Gene Ther.* (**2019**), doi: 10.1089/hum.2019.019

Sun, Z., Fontoura, C.S.G., Moreno, M., Holton, N.E., **Sweat, M.E.**, Sweat, Y., Lee, M.K., Arbon, J., Bidlack, F.B., Thedens, D.R., Nopoulos, P., Cao, H., Eliason, S., Weinberg, S.M., Martin, J.F., Moreno-Uribe, L., Amendt, B.A., "*FoxO6* regulates Hippo signaling and growth of the craniofacial complex," *PLOS Genetics* (**2018**), doi: 10.1371/journal.pgen.1007675

Sun, Z., Yu, W., Sanz Navarro, M., **Sweat, M.E.**, Eliason, S., Sharp, T., Liu, H., Seidel, K., Zhang, L., Moreno, M., Lynch, T., Holton, N.E., Rogers, L., Neff, T., Goodheart, M.J., Michon, F., Klein, O.D., Chai, Y., Dupuy, A., Engelhardt, J.F., Chen, Z., Amendt, B.A., "Sox2 and Lef-1 interact with Pitx2 to regulate incisor development and stem cell renewal," *Development* (**2016**), doi: 10.1242/dev.138883

Reviews:

Sweat ME, Pu WT. Genetic and Molecular Underpinnings of Atrial Fibrillation. NPJ Cardiovasc Health. 2024;1:35. doi: 10.1038/s44325-024-00035-5. Epub 2024 Dec 4. PMID: 39867228; PMCID: PMC11759492.

Commentaries:
Sweat ME, Pu WT. Editing the trajectory of hypertrophic cardiomyopathy. *J Cardiovasc Aging* 2023;3:28. http://dx.doi.org/10.20517/jca.2023.19

Presentations

Talks

Mason E. Sweat, Yangpo Cao, Xiaoran Zhang, Ozanna Burnicka-Turek, Carlos Perez-Cervantes, Brynn N. Akerberg, Qing Ma, Hiroko Wakimoto, Joshua M. Gorham, Mi Kyoung Song, Michael A. Trembley, Peizhe Wang, Fujian Lu, Matteo Gianeselli, Maksymilian Prondzynski, Raul H. Bortolin, Jonathan G. Seidman, Christine E. Seidman, Ivan P. Moskowitz, William T. Pu, **2023.** "Tbx5 maintains atrial identity by regulating an atrial enhancer network". BCVS early career session. Boston, MA.
* Talk was selected to be highlighted in the AHA Scientific Sessions meeting in poster format

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2019**. "Compartmentalization of Dental Epithelial Stem Cells is Regulated by *miR-200*." IADR/AADR/CADR General Session: Vancouver, BC, Canada.

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2019**. "Compartmentalization of Dental Epithelial Stem Cells is Regulated by *miR-200*." Iowa Microscopy Society Fall Meeting: Iowa City, IA

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2019**. "Examining the *Sox2+* DESC population at single cell resolution." Iowa Section of the American Association for Dental Research (AADR): Iowa City, IA.

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2018**. "New *in-vivo* microRNA biotechnology reveals specific roles for the *miR-200* family in craniofacial development." Iowa Section of the American Association for Dental Research (AADR): Iowa City, IA.

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2017**. "The *miR-200* family regulated dental epithelial cell differentiation *in vivo*." Iowa Section of the American Association for Dental Research (AADR): Iowa City, IA.

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2016**. " A Sox2-Lef-1 Protein interaction inhibits Lef-1 transcriptional activity and WNT signaling during odontogenesis" Iowa Section of the American Association for Dental Research (AADR): Iowa City, IA.

Posters

Mason E. Sweat, Yangpo Cao, Xiaoran Zhang, Ozanna Burnicka-Turek, Carlos Perez-Cervantes, Brynn N. Akerberg, Qing Ma, Hiroko Wakimoto, Joshua M. Gorham, Mi Kyoung Song, Michael A. Trembley, Peizhe Wang, Fujian Lu, Matteo Gianeselli, Maksymilian Prondzynski, Raul H. Bortolin, Jonathan G. Seidman, Christine E. Seidman, Ivan P. Moskowitz, William T. Pu, **2023.** "Tbx5 maintains atrial identity by regulating an atrial enhancer network". AHA Scientific Sessions. Phillidelphia, PA.

Mason E. Sweat, Yangpo Cao, Xiaoran Zhang, Ozanna Burnicka-Turek, Carlos Perez-Cervantes, Brynn N. Akerberg, Qing Ma, Hiroko Wakimoto, Joshua M. Gorham, Mi Kyoung Song, Michael A. Trembley, Peizhe Wang, Fujian Lu, Matteo Gianeselli, Maksymilian Prondzynski, Raul H. Bortolin, Jonathan G. Seidman, Christine E. Seidman, Ivan P. Moskowitz, William T. Pu, **2023.** "Tbx5 maintains atrial identity by regulating an atrial enhancer network". Weinstein Cardiovascular Development & Regeneration Conference.
* Poster received Presentation award

Mason Sweat[1], Yangpo Cao[1], Peizhe Wang[1], Qing Ma[1], Fujian Liu[1], Jasmine Feng[1], Michael Trembley[1], Brynn Akerberg, Vassilios J Bezzerides[1], William T. Pu[1,2], **2022**. '*Tbx5* maintains atrial structure, rhythmicity, and the atrial gene regulatory network'. Gordon Research Conference, New London, New Hampshire.
* Poster received presentation award

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2019**. "Compartmentalization of Dental Epithelial Stem Cells is Regulated by *miR-200*." IADR/AADR/CADR General Session: Vancouver, BC, Canada.

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2019**. "New *in-vivo* microRNA biotechnology reveals specific roles for the *miR-200* family in dental stem cell maintenance." Experimental Biology: Orlando, Fl.

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2018**. "New *in-vivo* microRNA biotechnology reveals specific roles for the *miR-200* family in craniofacial development." Experimental Biology: San Diego, Ca.

Sweat, M.E., Sweat, Y.Y., Eliason, S., Yu, W., Cao, H., Hong, L., Amendt, B.A., **2017**. "A Sox2-Lef-1 Protein interaction inhibits Lef-1 transcriptional activity and WNT signaling during odontogenesis." Experimental Biology: Chicago, Il.

Awards

Gordon Research Conference Poster award 2024

Poster Presentation Award; Weinstein Conference 2023
Gordon Research Conference Poster award 2022
IADR Bernard Sarnat Award; Finalist 2019
Travel Award- American Society of Anatomists for Experimental Biology 2019
Mary J.C. Hendrix Graduate Leadership Award 2018
Travel Award- American Society of Anatomists for Experimental Biology 2018
Hugh Vollrath Ross Scholarship 2017
Travel Award- American Society of Anatomists for Experimental Biology 2017
Max Smith Oral Presentation Graduate/Post-Doctoral Competition Award 2016

- Iowa Section of the American Association for Dental Research (AADR): Iowa City, IA.
- Talk: "A Sox2-Lef-1 Protein interaction inhibits Lef-1 transcriptional activity and WNT signaling during odontogenesis."

Graduation with University Honors 2013
University of Iowa, Iowa City, IA.

Previous & Active Research Support

K99HL173573 2024-

- My goal is to use our understanding of atrial gene expression and changes occurring in AF to design therapeutic strategies.

Ruth L. Kirschstein National Service Award (NRSA) Individual Postdoctoral Fellowship (F32) 2022- 2023

- My goal is to use multiomics to profile the atrial cardiomyocyte gene regulatory network.

Ruth L. Kirschstein Interdisciplinary Research Training Award (T32) 2020-2022

- Supported by an institutional training grant for postdoctoral training.

Ruth L. Kirschstein Interdisciplinary Research Training Award (T90) 2017 – 2020

- National Institutes of Health (NIH) / National Institute of Dental and Craniofacial Research (NIDCR), Bethesda, MD.

Mentoring Experience

During graduate school and during my postdoctoral fellowship, I have mentored trainees at multiple career stages including graduate students, medical students, undergraduate students and research assistants. My mentees mastered complex wet lab and dry lab skills and have gone on to successful roles in research, medicine, and biotech. Some notable mentees include:

- Jie Li, M.D. Jie is a visiting scholar in Dr. William Pu's lab and a PI at Nanjing Hospital in China. She recently obtained
- Erin Keating, RA. Erin is a fulltime member of the Pu lab who assists me with my work. Erin is applying to Medical School.
- Lauren Hill, Harvard College undergraduate- I mentored Lauren for 2 years while she completed her undergraduate thesis to graduate with honors. Lauren is in the process of applying to Medical School.
- Matteo Gianeslli, MD- Matteo performed a summer internship under my direction, which in part inspired his desire to pursue a Ph.D. at the Icahn School of Medicine at Mount Sinai.

TA- Biochemistry and Molecular Biology Fall, 2017
University of Iowa, Iowa City, IA.

- Attended lectures and wrote exam questions for this undergraduate course
- Held office hours and review sessions before major examinations

Coursework Highlights

- Critical thinking series in development, genetics and cell biology

- Epigenetics, Cancer and Mouse Models
- Mechanisms of Cellular Organization
- Transcription RNA

Extracurricular Involvement & Professional Society Membership

- American Heart Association 2021-
- American Association of Anatomists 2016- 2020
- International Association for Dental Research 2018-2020
- Coordinator, Craniofacial Interest Group 2017-2020
    - Organize and maintain membership list across 4 different Midwest Universities
    - In charge of organizing schedule of presenters for each semester